

WWI

Fokker Triplane

Flight Simulator

By Donald A. Hill, Jr.

INSTRUCTION MANUAL

ENGLISH, FRANÇAIS, DEUTSCHE & ITALIANO

GAMETEK

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English, Deutsch, Français & Italiano

Re-release, version 2

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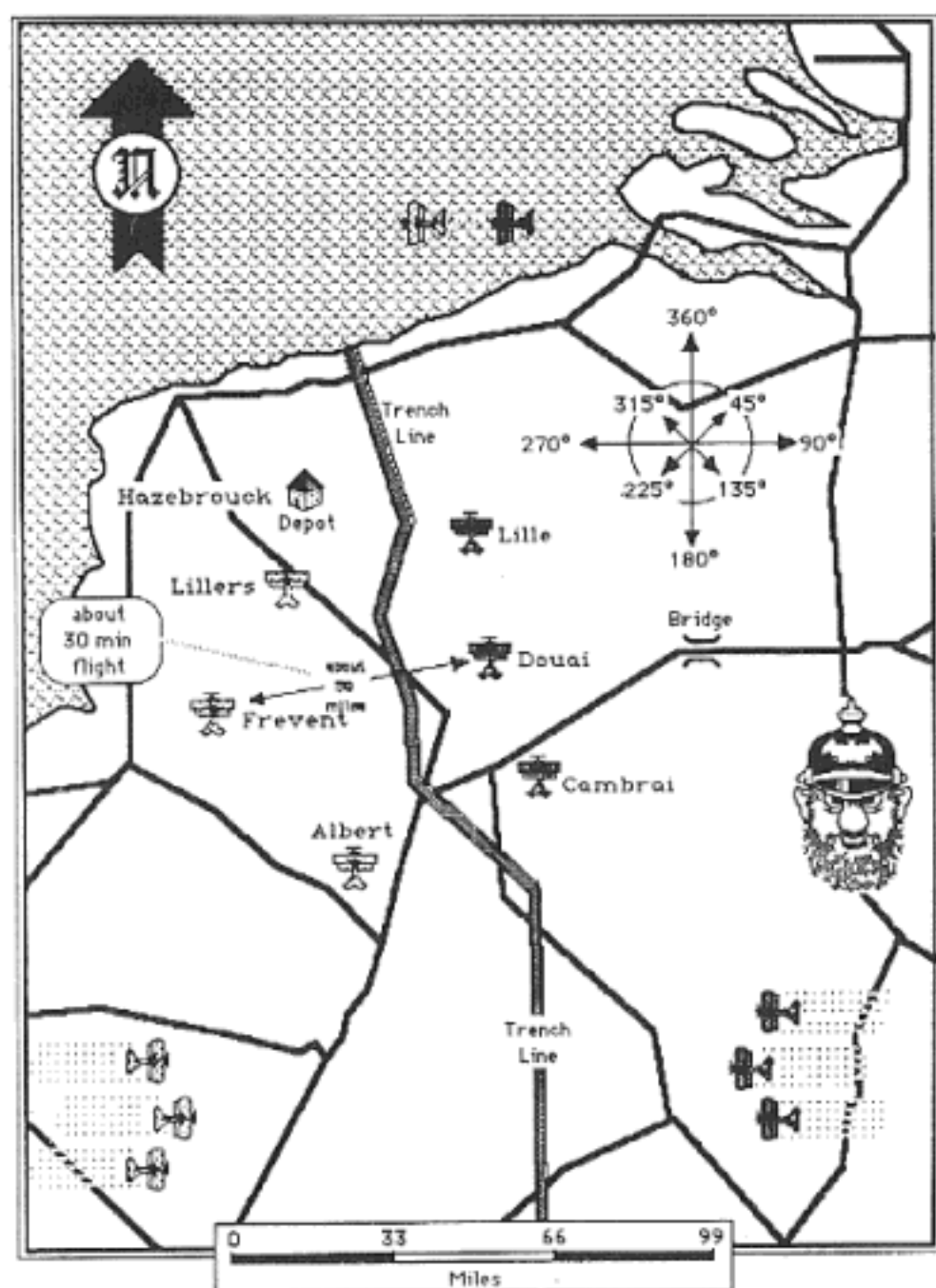
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Program and Documentation by Donald A. Hill, Jr.
Cover Art by David M. Toy, Jr.



Map of the World

Use to navigate or to get heading info when using ADF and "Go Cross Country". Multiply number of miles by 6 to obtain number of minutes for "Go Cross Country". Balloons may be found near trench lines. Fly south to find Paris.

Map courtesy of Udo C. J. Fisher

Introduction

Welcome to the realm of Fokker Triplane.

Fokker Triplane is a look back into times of Baron Manfred von Richthofen and Captain Brown, of chivalry and honor, of blue skies and the tension of battle. It's you in your crate against him in his... the joy of flying and the threat of death.

You will be flying the most striking image of World War I aerial combat – the Fokker Triplane. This aircraft can climb 1750 feet per minute and turn on a dime. The Triplane was the symbol and vehicle of Baron von Richthofen, Germany's most famous ace, leader of the flying circus, and the war's most successful pilot.

You'll start out shaky, unsure of yourself (not unlike the pilots of the time who were sent into battle with perhaps 10 or 20 hours of training), but soon you'll be doing loops, rolls and be in total control of your aircraft. Then you'll go cross country, testing your new found flying skills and becoming acquainted with your surroundings. A little cocky, you'll try a dogfight. You might get shot down the first few times but before long, you'll be master of the skies.

You'll feel confident flying over the trench lines and entering enemy airspace. Your mission: down observation balloons, destroy enemy fuel depots, engage hostile aircraft, and recover important spy papers.

This is Fokker Triplane.

So put on your goggles and scarf, climb into the cockpit, and go flying... The sky's the limit.

Getting Started

The "Quick Flying Instructions" chapter will get you into the air fast with the bare essentials of flying. After you play a little, be sure to read the rest of the manual for complete instructions.

The manual includes: **The World** describes the area you will be flying in, **The Menus** tells all about the menu options, **Ground School** explains how planes fly, **Flight School** gives in depth instructions on flying and landing, **Military Training** helps you dogfight, **Mission Briefings** details 10 separate missions including a step by step study of aerobatics, and **About Fokker Triplane** is a brief message from the author.

The diagram below is all the keyboard commands available. The Sound toggle has three positions; all sounds on, all sounds except engine sound on, and all sounds off. The mouse button is used to fire the guns. Hold it down for continuous firing.

Keyboard Commands (Select item, then enter one keypress)

<input checked="" type="radio"/> Engine Off = `	<input type="radio"/> Forward View = W
<input type="radio"/> Engine Idle = 1	<input type="radio"/> Left View = A
<input type="radio"/> Engine Descent = 2	<input type="radio"/> Rear View = Z
<input type="radio"/> Engine Cruise = 3	<input type="radio"/> Right View = S
<input type="radio"/> Engine Climb = 4	<input type="radio"/> Center Stick = (space bar)
<input type="radio"/> Engine Full = 5	<input type="radio"/> Sound Toggle = H
<input type="radio"/> Engine War Power = 6	<input type="radio"/> Down View = D
<input type="radio"/> Prepare/Drop Bomb = B	<input type="radio"/> Cowl Toggle = C
<input type="radio"/> Left Rudder = Q	<input type="radio"/> 45/90 Up View (Toggle) = H
<input type="radio"/> Right Rudder = E	<input type="radio"/> Straight and Level = Y
<input type="radio"/> Center Rudder = R	<input type="radio"/> Pause (or always backspace) = P

Enter new key

OK

Cancel

Quick Flying Instructions

What follows is a brief description of flying the Fokker Triplane. For a complete description and step by step lessons, be sure to read the Ground and Flight School sections.

Put the Fokker Triplane disk into your disk drive and launch the Fokker Triplane application. The Fokker disk does not have a finder on it, so it will not boot. **You'll have to start up your computer with your hard disk or with another floppy disk first.** If you have a color display select 16 colors from the control panel before you run the program. Or Fokker Triplane can display in black and white. Selecting 2 colors (which is black and white) can greatly enhance performance on slower color machines.

Fokker Triplane flight simulator has two modes-pause mode and flight mode. The pause mode, where the program begins, allows you to use the mouse in the typical Mac way. (Select pull down menus and use the desktop applications.) This mode is characterized by the standard arrow type pointer.

In the fly mode, the pointer changes to a circle with a cross in it and cannot be moved outside the stick box. In this mode you cannot access any of the menus. You must be in this mode to fly the aircraft. You must "pause" to change options or to quit.

To enter the fly mode, click the mouse anywhere in the window. Where you click in the window determines the control column position. Clicking in the center of the window, both up/down and left/right, will center the control column. The control column, also called the stick, is the part of the aircraft that controls the attitude of the aircraft.

To exit the fly mode, press the Backspace key (it's labeled delete on some keyboards) or the user defined pause key which is preset to "P".

If you move the mouse around while in the fly mode, you'll notice the circle and cross hair pointer moves around in the box at the lower center of the window. This corresponds to the position of the control column. Your Triplane is controlled by moving its control column. Move the mouse left, the **stick goes** left and the aircraft will bank Left. The opposite happens when you move the mouse to the right. Move the mouse back or away from the computer, the stick comes back and the nose goes up. Again, the opposite happens when you move the mouse forward or toward the computer. Remember that when the nose comes up, the airspeed drops. If you climb too steeply, you will stall and temporarily lose control of the aircraft. There is a "panic" button available. **Press "Y" for yipes, and the program will level the aircraft out and produce a safe airspeed.** When climbing, it's best to keep the horizon visible. And remember not to twist or unintentionally lift the mouse when trying to control the airplane.

Initially, you will start in your Fokker Triplane parked at the south end of the long runway at Douai. Since the Fokker is a tail dragger (the tail sits on the ground), you'll be looking slightly upward, into the air. When you Throttle up, the tail will lift off the ground and you'll see the more typical view looking down the runway. See the callout chart on back cover for the location of the cockpit gauges. Several of the instruments look modern, and of course they are, or at least they were not invented or in general use at the time of the Fokker Triplane. WW

I pilots Learn to “fly by the seat of their pants”. The Mac doesn’t have a seat of the pants interface so I included these instruments to make flying easier.

Taking off. Click in the Fokker window to enter the fly mode.

Center the stick by pressing the space bar (you’ll see the cross hair pointer move to the center of the stick box). Press “R” to make sure the rudder is centered. Be sure you’re looking forward, you’ll see the gun sight and the curved top of the cowl. Pressing “W” tells the program you want to look forward.

Throttle up to full power by pressing “6”. Within a few seconds the tail will come off the deck and you’ll see your airspeed rising. Also, the artificial horizon will be half white, half black. Leave the stick centered until the airspeed is above 55 mph. (The aircraft stalls around 40 mph.) Pull back gently (move the pointer down a little) and the tail will drop, increasing your angle of attack. Very quickly you’ll be in the air. The Low Altitude Warning indicator will begin to flash and the altimeter will begin to move.

Taking off is pretty simple. The only danger is climbing with the nose at too steep a slope, or not keeping the wings level.

Watch the artificial horizon to keep the climb angle safe, or merely keep the horizon visible above the cowl. A safe climb is when the white in the gauge stays above the bottom of the “V”. Keep your airspeed around 80 mph for maximum climb rate, under full power.

A Fokker Triplane will be taking off in front of you. It’s a friendly aircraft. He will takeoff and land continuously. Don’t fly into him.

Flying about. To turn, first bank the aircraft by pushing the stick left or right. Return the stick to the center when you have about 30 degrees of bank. The aircraft will start to turn. Pull back on the stick if the nose drops. You are flying level when the horizon line goes through the gun sight.

Rudder can also be used to turn or to make minor heading adjustments. Remember to center the rudder when you are finished turning.

Be careful of sustained dives. Your airframe will come apart at speeds above 190 mph.

Landing. Landing consists of two main phases: lining up with the runway, and then the actual landing. To line up, fly downwind a couple miles and fly perpendicular to the runway you want to land on. Turn 90° and face looking straight down the runway. Use the rudder to make minor heading corrections. When lined up, throttle down to maintain an airspeed of 50-60 mph. As you fly over the end of the runway, throttle down to idle and maintain a slightly nose up attitude. You must land with the horizon below the gun sight. Keep the wings level.

You can load the provided file, "Lined up with Runway" to practice the second phase. Once you can handle the landing part, use the On Approach starting position to practice lining up and of course the landing part. The main points for landing are:

1. Line up with the runway, but when you get close to the ground, don't make any heading changes, either go around, or land in the grass off the runway. Beware of the hangar and tower. These objects are solid and you can't fly through them.
2. Keep your airspeed low, 50-60 mph on approach, 40-50 mph when you flare to land. If you're going too fast, when you bring your nose up to flare, you'll gain altitude.
3. Be sure the horizon is below the gun sight. If you land with your nose pointed down, you'll not survive the landing.
4. Practice makes perfect, stay with it. If you have a big score and are coming in for a landing, you can "cheat" by saving the game before you land. That way if you crash you can always load the game and try again.

After you land, you must come to a complete stop in the hangar and turn the engine off (" " key) before you'll be refueled. You'll also get a full load of bombs. Remember, there are no brakes on this aircraft, so be careful on rollout.

The World

The "world" is northern Europe, just across the channel from southeast England where actual air battles of 1917 took place. There are three friendly and three enemy air bases. Douai, Lille, and Cambrai are the friendly bases and they are east of the trenches. Lillers, Frevent, and Albert are the enemy bases and they are west of the trench lines.

Douai is your main base and this is where Richthofen was based during 1917. Friendly bases have a hangar and Douai also has a wind sock which will show the wind direction. Enemy bases have one or more fuel depots.

The trench lines run between the friendly and enemy bases. Trenches are represented as a double set of dotted lines on the ground. Solid lines on the ground represent roads. There is also a grid made up of dotted lines. This is to help visual orientation.

The ground is solid white and the sky is a dotted pattern in the black and white mode. In color mode, the sky is blue and the ground is green.

At friendly bases you see another Triplane flying around and landing. The enemy aircraft is a Sopwith Camel. The Camel is a biplane and will have two wings instead of the three the Triplane has.

Observation balloons are found over the trench lines. Shoot them down, but don't fly into them. They leave a crater on the ground after you shoot them.

East of Douai is a bridge. It's fun to try to fly under the bridge and you get bonus points for doing this.

Deep in enemy territory you might see an arrow and a square. This is a signal from a spy placed behind enemy lines. Land in the square and you'll receive fuel and important papers from the spy.

Ground level is 200 feet.

The Menus

File Menu has five items, "New", "Open...", "Save", "Save as...", and "Quit".

New restarts your position back to a friendly base, clears all scores, and is just like restarting the application. It uses the Locations menus to decide where to put your aircraft.

Open... allows you to load a previously saved game. You will lose the current game.

Save will save the current game to the current title, overwriting the game already saved in that title.

Save As... asks for a title for the current game, then saves it. After you use Save As, you can use Save to keep the file up to date with your current position.

Quit exits Fokker Triplane.

Game Menu deals with control and enemy settings.

Change Keys... allows you to rearrange the keyboard layout. If you want to start every game with this layout, start Fokker Triplane, rearrange the keyboard, and then save a file. You could call this file Start Fokker or something like that. The next time you play Fokker, double click Start Fokker and your new keyboard layout will be loaded. If you launch the Fokker Triplane program directly, the original layout will again be present.

Change Sensitivity... has two items, "Stick Sensitivity", and "Stick Center Play". Stick Sensitivity controls ratio between the mouse movements and the surfaces movement. You can turn sharper with a more sensitive stick. Stick Center Play sets how close to the center the stick has to be for centered surfaces. This is helpful when a joystick is being used. Many joysticks don't quite center perfectly, so set the center play larger.

Go Cross Country allows you to quickly transverse large amounts of country. Enter the desired heading, your current heading will default, and select how many minutes to fly in that direction. The aircraft will fly at 100 mph at the selected heading for the number of minutes entered. You can figure out the number of miles by using the ADF, (explained later), or by using the map. Multiply the number of miles by 0.6 for the number of minutes. Go Cross Country only works while airborne.

Armed vs. UnArmed and **Armed vs. Armed** defines the enemy aircraft's ammunition. You always have live ammo, but if you select Armed vs. UnArmed, the enemy will be shooting blanks.

Frequent Enemy Aircraft, Infrequent Enemy Aircraft, and No Enemy Aircraft is how often you'll see enemy aircraft when you're away from one of your bases. If you want to get into dogfights as quickly as possible, select Frequent Enemy Aircraft. The enemy will come after you almost immediately. (The enemy will not attack you at one of your bases, unless he follows you there.) Infrequent Enemy Aircraft is probably more realistic, and also it can be harder because you may get surprised by the enemy. If you want to just fly around and do other things, select No Enemy Aircraft and you won't be bothered.

Enemy Fly Aggressively, Enemies Fly Straight & Level, Enemy Fly Level Circles, Enemy Fly Loops and Reset Enemy commands the enemy to fly each specific way. The first one is normal dogfight mode. The others tell the enemy to fly in each specific way. If you lose sight of an enemy that is flying straight, circles or loops, use Reset Enemy to bring him back in front of you. All of these work when you fly away from a friendly base.

Weather Menu controls the wind and clouds.

Set Wind... allows you to specify a wind up to 30 mph and at any heading, 0-359 degrees. Or you can select Random Wind where the speed and direction will change automatically and randomly.

Set Clouds... defines a cloud ceiling. You can set it from 0 to 29,999 feet. The clouds are solid above the altitude you set, so once entered, you will see nothing out the window until you descend below the cloud altitude. To clear the skies, enter "clear" instead of an altitude.

Locations Menu controls where you are and where you'll begin after a crash.

Douai, Cambrai, and Lille are the names of your air bases. Whichever one is checked is where you'll start after a crash. Also, you can use this to fly to these air bases. If you select Cambrai, you'll fly there instantaneously.

On Runway and On Approach select where you'll be after a crash and also when you select it. When you first launch Fokker Triplane you'll be on the runway and that's what is selected. If you select On Approach, you'll move to the air, on approach to land. This is convenient when practicing landings because if you crash, you'll begin again on approach.

Set ADF... is how you change the ADF, which stands for Automatic Direction Finder. There are several places around the "world" where small devices are located that your aircraft can home in on. (This is not realistic to the period.) Originally, the ADF is set to Douai. The ADF provides heading and distance in miles from whichever direction finder is tuned in. Besides Douai there are: Cambrai, Lille, Lillers, Frevent, Albert, the Bridge, and Hazebrouck. You can use the ADF to get information for the Go Cross Country feature. Remember to multiply the number of miles by 0.6 for the number of minutes.

Famous Pilots Menu tells you the current pilot name and score and it also keeps track of the top five pilots.

New Pilot Name... allows you to change the current pilot name.

Clear Top Five Pilots... allows you to erase the top five scores.

The other items in this menu's list are static. They provide information but cannot be selected.

Ground School

For many people an airplane zooming through the sky is a source of mystery. But like most mysterious things, once explained they are not only easy to understand, but actually become logical.

All things with mass (weight) are subject to gravity. Drop a rock, a person, or a boat off a building and it falls to the earth. But airplanes don't fall to the earth. They are able to stay in the air. Therefore, they must, by some means overcome gravity. And that's exactly what they do. They overcome or counter gravity by another force. This force is called lift. So for an airplane to fly straight and level (to stay in the air) it has to have exactly the same amount of force pulling it up (lift) as its weight pulling it down (gravity). It follows then that to climb (gain altitude), the aircraft needs to create more lift than its weight, and to dive (lose altitude) it needs less lift. Airplanes do sometimes fall out of the sky, but only if they lose their ability to create lift.

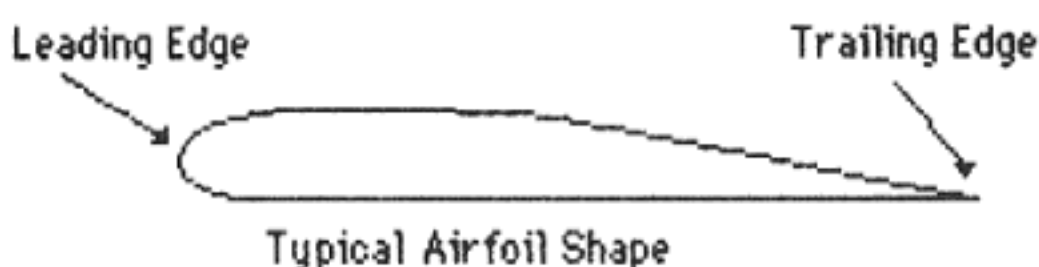
Lift

Lift is produced in two ways: from the angle of attack of the wing to the flight path, and in a way that's explained by Bernoulli's principle.

Bernoulli was a Swiss scientist who lived from 1700 to 1782. His principle states, "As the velocity of a fluid increases, the pressure in the fluid decreases". And it also works conversely. Bernoulli's principle explains the relationship between pressure and flow velocity. This relationship is also true for a gas. And of course, a plane flies through air, which is a gas.

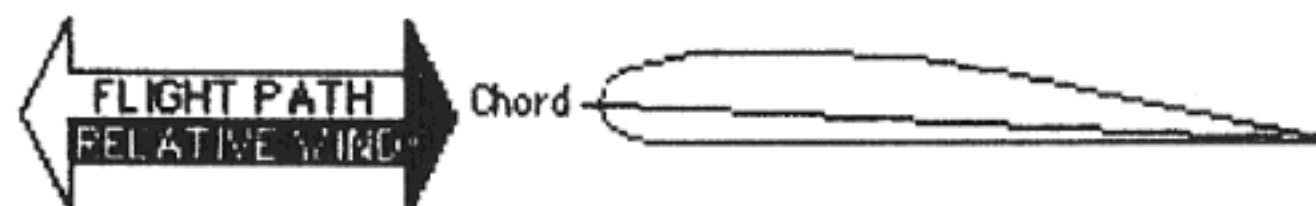
So if we can increase the speed of the air flowing on top of the wing, the pressure will decrease and the pressure underneath the airplane will push it up. And that's exactly what the wing does. Wings have a special shape called an airfoil. The term airfoil refers to the shape of a cross section of the wing. In other words, if you slice a wing parallel to the fuselage you can see the shape of the airfoil.

A typical airfoil looks like this:



The airfoil forces air to move faster over the top edge of the wing than over the bottom edge, thus producing less pressure on the top. This, in effect, sucks the wing upward.

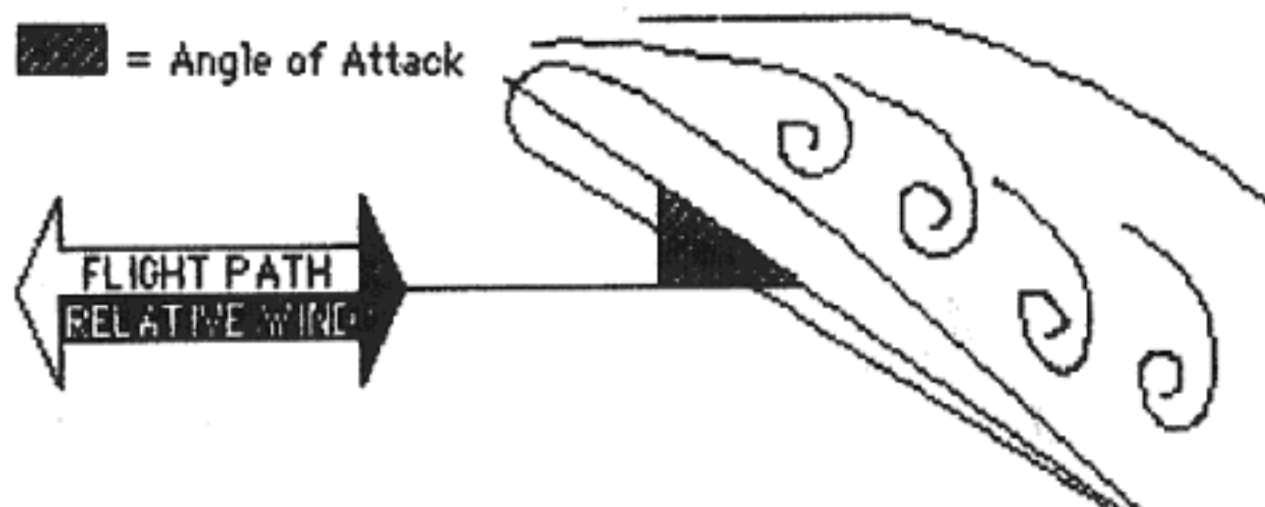
Some additional lift is produced from air pushing on the wing. The angle at which the oncoming air strikes the wing is called the angle of attack. As the angle increases more lift is created. It's the same as putting your hand out the window of a moving car. If your hand is flat and pointing into the wind it moves smoothly. If you angle it to the wind you can feel it being pushed up (and backward). Below, angle of attack is zero, no extra lift is produced:



 = Angle of Attack



Wind now is hitting at more of an angle and is pushing the wing up. (It also slows the airplane down.)

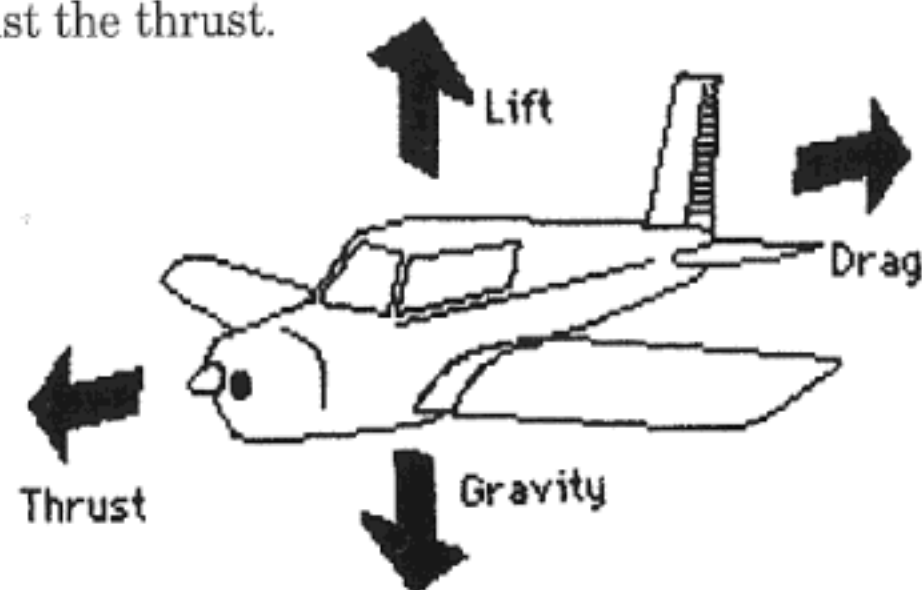


At some point, the angle of attack becomes too great and air stops flowing smoothly over the top of the wing. When this happens the wing stops producing lift. This is called a stall and makes the aircraft fall. Most aircraft are designed so that during a stall, the nose drops toward the ground. This automatically increases the airspeed (the speed of the air flowing across the wing) and reduces the angle of attack, this gets the wing "flying" again.

Relative wind is the direction of oncoming wind. Flight path is the direction the aircraft is moving. The flight path creates the relative wind so the relative wind and flight path are always parallel and go in opposite directions. So angle of attack is determined by the attitude of the wing to the direction of the relative wind.

Two other forces affect the aircraft; thrust and drag. Thrust is the name of the force propelling an aircraft forward (commonly a propeller, which is a spinning airfoil, or a jet engine). Drag is the friction from the air the plane is

moving through, and this friction pulls against the thrust.

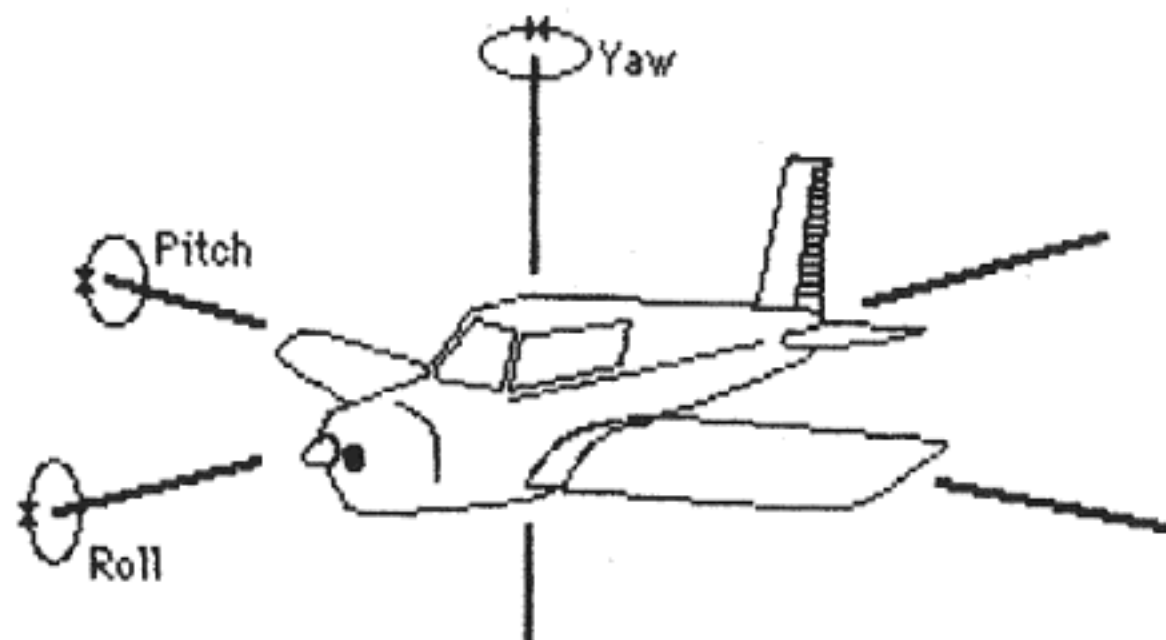


Basically, when flying straight and level at a constant speed, thrust and drag are equal. To go faster you must either decrease drag or increase thrust. Most vintage aircraft, including the Fokker Triplane, can't change drag (by raising the landing gear or flaps) so the only alternative is to increase thrust. Thrust can be increased by adding throttle to the engine. (Just like pressing the accelerator in a car.) When thrust is increased, it becomes greater than the force of drag and the aircraft goes faster. As the airplane goes faster, more drag is created until at some point, thrust and drag become equal again and the aircraft stops accelerating.

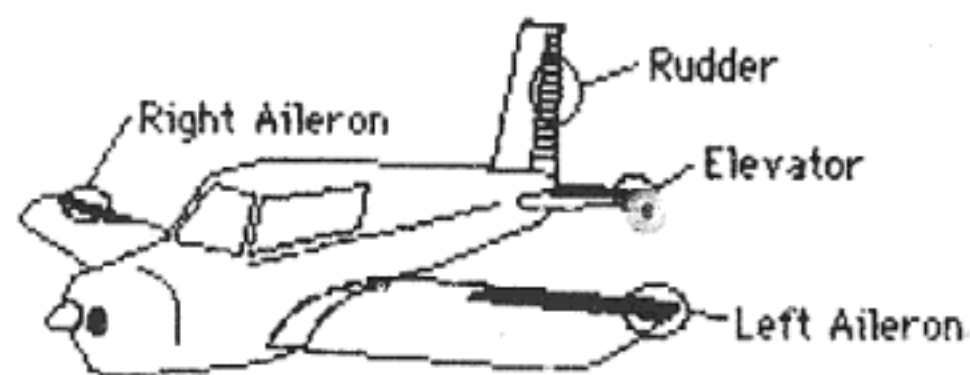
To summarize, airplanes fly because the airfoil can create lift which overcomes the weight of the aircraft. Lift is produced when air passes over the wing. The shape of the wing, the airfoil, makes air move faster over the top edge than the bottom edge which decreases the air pressure on the top of the wing, producing lift. Lift makes airplanes fly.

Controlling an Aircraft

Aircraft fly in 3 dimensions. That is: height, width, and depth. They can also twist in 3 dimensions. They are: pitch, roll and yaw.



The three "twists" can be shown with your head: nodding "yes" is pitch, shaking "no" is yaw, and touching your ear to your shoulder is roll. Aircraft have surfaces that move the aircraft about these axes.



Control Surfaces or Fins

Elevator makes the aircraft pitch, rudder makes it yaw, and ailerons produce roll. These surfaces, or fins, move into the airflow which alter the aircraft's attitude. If, for example, the elevator moves up, more air hits it on the top than on the bottom, and it forces the tail down bringing the nose up. And, of course, the opposite happens if the fin goes down. The rudder works the same as the elevator but changes yaw. (Just like a sailboat's rudder.) Ailerons are located on the trailing edge of the wing, one on each side, starting near the outer tip and moving inward. The two ailerons move in opposite directions. That is to say when one goes up, the other goes down. This produces a roll effect because one wing tip is forced up, the other down.

These three surfaces, along with throttle, are the means to control an aircraft. A pilot controls these surfaces with a stick, rudder pedals, and a throttle slide.

The pilot sits in the fuselage with his feet on the rudder pedals. Pushing forward on one rudder pedal makes the other pedal come backward and vice versa. This makes the rudder go left or right.

The control stick comes up from the floor between the pilot's legs. The stick is connected to both the elevator and ailerons. When the stick is centered, straight up and down, both surfaces are centered. Moving the stick left makes the ailerons move, banking the aircraft to the left. Right stick banks the aircraft to the right. Pulling back on the stick brings the nose of the aircraft up. Pushing forward makes the nose go down. Moving the stick left and back brings the nose up while banking left. Remember that these movements, left/right, up/down are in relation to the pilot, NOT in relation to the ground. If the aircraft is inverted, pulling back on the stick still makes the nose go up, in relation to the pilot, but the nose will be going down toward the ground!

The throttle slide is located on the instrument panel, sticking out toward the pilot. Pushing it in toward the panel increases throttle, pulling it back toward the pilot decreases throttle. (This is shown as an up and down slide in Fokker Triplane.)

To summarize, an airplane has three axes of rotation: pitch, roll, and yaw. An airplane has three control surfaces, elevator, ailerons, and rudder which correspond to movement about each axis.

Instrumentation

On the instrument panel are several gauges. The three main gauges are airspeed indicator, artificial horizon, and altitude indicator (or altimeter).



The airspeed indicator is like a speedometer in a car. The numbers on the face represent 10's of miles per hour. (So if the arm points to 10 it means the airspeed is 10x10 or 100 mph.) Airspeed means the speed of the airplane going through the air. It is not necessarily the same as the speed the airplane is flying over the ground (ground speed). If you are flying directly into a 10 mph wind and the airspeed indicator reads 100 mph, your ground speed is 90 mph. The Fokker will stall at around 38 mph so it's important to keep an eye on the airspeed indicator.



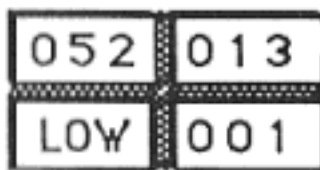
The artificial horizon is exactly that – an artificial representation of the actual earth's horizon. It displays where the horizon is when compared to the aircraft's attitude. The artificial horizon is very useful if you get mixed up about what the aircraft is doing. (This can happen quite easily if there are no out-the-window references, like when you're in the clouds.) The gauge displays white for sky and black for ground. The horizon is where the colors meet. Sometimes the gauge displays all white or all black. This means the airplane is in an extreme up or down attitude.



The altimeter displays the altitude of the airplane in feet. This is the altitude above sea level, NOT over the ground. This is an important point. The ground you'll be flying over is 200 feet above sea level. You cannot fly below 200 feet. Notice what the gauge reads while on the ground. This is the ground altitude. The gauge has a long hand and a short hand just like a clock. The number the long hand points to is hundreds of feet, the short hand points to thousands of feet.



The fuel gauge works exactly like in a car. Remember, you won't find gas stations on every cloud. Look at the gas gauge once in a while and act accordingly.



The gauges above, left to right, top to bottom are: Compass, ADF heading, Low Altitude Warning indicator, and DME, or distance in miles to the ADF device. The compass tells you your current heading. The ADF (or Automatic Direction Finder) gauge tells the direction to the selected VOR (or Very high frequency Omnidirectional Range). If you guide the aircraft to this heading, you will eventually fly to the VOR. The Low Altitude Warning indicator looks white with black letters (LOW) while on, or more than 250 feet above, the ground. When the aircraft is within 250 feet of the ground it flashes alternately white and black. The last item, the DME (Distance Measuring Equipment), shows, in miles, the distance from the selected VOR. (A VOR is a milk bottle-shaped structure you might see out in a field. It broadcasts a radio signal that the radio in the aircraft picks up and uses for direction and distance.)

This completes ground school training. You are ready for flight school.

Flight School

Flight school consists of using the principles of flight (learned in ground school) to control a flying aircraft. The first thing you'll learn is how to takeoff. Launch the Fokker Triplane program and enter fly mode by clicking in the window.

Before you do anything else do a preflight check:

1. Center stick in stick box. (You can do this by pressing the space bar.)
2. Make sure the rudder is centered. (To see what the screen looks like when the rudder isn't centered, press "E" a couple of times. Then press "D" to center the rudder). See page 7 for a complete list of keyboard assignments.
3. Check fuel gauge.
4. Make sure the front view is selected. (Press "W".)

Other things you might check are cloud ceiling, wind selection, and game options. But for now the list above is all you need worry about.

Your Fokker Triplane can lift off the runway at 50 mph. Read through the following eight steps and then try to takeoff.

1. Throttle up to full throttle. (Press "6" on the keyboard.) After a couple of seconds the tail will come off the ground and you'll be rolling down the runway.
2. Alternately look straight ahead at the runway and down at the airspeed indicator. The Fokker begins in the middle of the runway-lined up with the stripes. If you had just landed or if the wind was blowing, you might need to steer the airplane to keep it on the runway. Steer the Fokker on the ground using the rudder. The surfaces become very sluggish when the aircraft is moving slowly. It may take full rudder to get the plane to turn. As the airplane speeds up, more air flows over the fins and the surfaces work better. Remember to center the rudder when you're lined up.
3. When the airspeed reaches 60 mph, gently pull back on the stick. (i.e. move the mouse pointer down in the stick box.)
4. The aircraft will rise into the air. You will know you're in the air because the altimeter will begin to move and the Low Altitude Warning indicator will begin to flash.
5. Once in the air, move the stick back to the center.
6. Look at the artificial horizon to assure a safe climb angle. A safe climb angle is when the horizon is between the top and bottom of the "V" in the gauge, or as long as the horizon is visible out the window.
7. Once a safe altitude is achieved, push forward on the stick (move the mouse pointer up) a little to bring the nose down level with the horizon. You know you're level when the horizon goes through the gun sight or when the horizon line on the artificial horizon is aligned with the wings on the gauge.

8. The last thing to do is throttle down to “4” to conserve fuel and engine wear and tear.

Now practice climbing 500 feet, level off, then dive 500 feet. Pick the altitude you’re going to climb to before you start the climb. Try to level off at exactly the correct altitude. Don’t climb with the nose pointed straight up. Just ease the nose up or down a little to climb or dive.

Turning the Fokker is generally easier than a real airplane. Real airplanes can slip or slide through the air during turns, if rudder and ailerons are not coordinated properly. In this simulation rudder and ailerons are automatically “coordinated” so turns can be performed effortlessly.

To turn the Fokker, bank the aircraft about 30 degrees by moving the stick gently left.

Move the stick near the center when the proper angle is achieved. The aircraft should now be in a gentle turn. You know it’s turning when the compass is continuously changing. If the airplane is banked but the compass isn’t changing, you’re only flying crooked, not turning. If this happens, move the stick to the left again and bank the airplane a little more. You may sometimes need a little back stick to keep the nose on the horizon.

To stop turning, move the stick in the opposite direction that it was moved to enter the turn. If you entered the turn with left stick, use right stick to exit the turn. Use right stick until the wings are level.

You can gain, lose, or hold altitude while turning. To gain or lose altitude, put the aircraft in the proper attitude (nose up or down) before you enter the turn.

Holding altitude in a turn takes more effort. When an aircraft is banked, its lift is no longer pulling straight up. Lift pulls perpendicular to the wings, but gravity is still pulling straight down. So if you’re holding altitude with the wings level, you may lose altitude slowly with the wings banked. To hold altitude then, adjust the nose up or down slightly as needed.

Now practice turning to a heading. Look at the compass and pick a heading about 90 degrees away. (Add or subtract 90 from the current heading.) The trick is to exit the turn at the proper heading. If you start to level the wings at the heading you want, you’ll be too late and go past the heading. Begin to level the wings several degrees before you reach your selected heading.

Climbing, diving, and holding altitude along with the ability to turn to a heading, are the major components of landing. Master these skills and landing is a snap.

Landing is by far the most difficult task in civilian flying. The Fokker, in this simulation, is actually quite easy to land once lined up with the runway.

Landing the Fokker can be thought of as a two-phase task. The first phase consists of lining up with the runway. Phase two is the actual landing of the airplane.

The key word in lining up with the runway is patience. Lining up requires patience because it is easy to get impatient flying away from the airport, starting your approach too close to the runway. It's best to start your approach about 3 miles away while learning. Later, when you can line up with less effort, you can start closer.

Also, as you get closer to the runway things seem to speed up. This is called panic. Things are not really moving faster, but since things are closer, they move more on the screen, which creates the effect of things moving faster. Don't expect to get lined up the first few times you try.

To begin an approach, fly to a point about 3 miles away from the runway and then turn toward the runway.

The best approach is to fly perpendicular to the runway you want to land on. Your altitude should be 1,700 feet. You can use the On Approach setting to start the Fokker 3 miles out, waiting to turn final. (To tell the distance to a runway be sure to select the correct VOR from the ADF menu.)

Runways always run north/south or east/west. Or in degrees, 000/180 or 090/270.

The following landing instructions will assume you have selected On Approach.

You are currently flying 52 degrees heading at 1,250 feet, one mile out from the runway. You can follow the Triplane in front of you, when he turns, you should also turn. You will pick up the airport visually. Being lined up means the airplane is lined up with the center of the runway and has a heading of 000. The rudder can be used to make minor heading adjustments.

If you get close to the runway and are not lined up, give up on landing on this approach and try again. (Pilots would say, "abort and go around".)

Phase two, landing the Fokker, is the easy part. You can load the file "Lined up with Runway", which will start you all lined up, ready to practice landing.

Once lined up, make sure your wings are level. Point the nose at the near end of the runway until your altitude is about 300 feet. Then bring the nose up level with the horizon. At this point you are home free. You basically do not need to use the stick any more. Keep the nose at or a little above the horizon. Control altitude and rate of descent with throttle. Use throttle setting "1" to land, or if you're going too slow and not ready to land, use "2" or "3" briefly.

When you touch down you'll hear the tires squeak. Sometimes you'll bounce a little. You can't always see that you're bouncing but you can tell because you'll hear a second (or third... fourth...) squeak. The aircraft bounces when the rate of descent is a little too quick.

Be patient with yourself when trying to land. It may seem next to impossible at first, but soon it becomes second nature.

You now know the basic principles of flying, landing, and taking off. It may take several hours to master these skills, but stick to it. From these skills, basic control of the aircraft, comes more advanced skills... aerobatics and the ability to engage in combat with another aircraft.

The first three missions deal with taking off, flying, and landing. You might now fly these missions as further practice.

Military Training

Once you've learned to control your aircraft it's time to get radical. You won't last 5 minutes against an opponent if you do nice graceful turns. You've got to yank your crate around the sky. Don't be afraid to move the stick all the way to the edge of the stick box.

A classic military maneuver is Lufbery turns. Lufbery turns are ultra-steep maximum banked turns designed to position your aircraft on the tail of the enemy. This maneuver and others are detailed in mission 9.

At first, your aircraft turns much sharper than the enemy so you can get on his tail using Lufbery turns. Put your aircraft into a 75-85 degree bank and keep the nose on the horizon. Continue to turn for a while and you will see the enemy in front of you. Once you're on his tail, line him up in your gun sight and shoot him down. Try selecting "Enemy fly level circle" to practice turning on the enemy. Make the selection before leaving your air base.

The looking up key, "X", toggles between 45 and 90 degrees up. This is useful when both you and the enemy are in tight turns. You can see if you are gaining ground by looking up to see the enemy. In the actual Triplane, the 45° up view was pretty well blocked by the upper wing, but I've made the view clear. You'll know you're seeing the 45° view because it will say 45° on the screen. The 90° view doesn't say anything. Use "W" to look forward again. A second technique is to climb about 1,000 feet above the enemy, then dive on him and get the first shots in. Keep airspeed below 180 mph.

When you have the enemy in your sights, fire your guns continuously.

The enemy pilots get smarter each time you shoot them down. As they get better, Lufbery turns may not do the job and you'll have to use different tactics. Also, the enemy will fly into you if he gets the chance, so use evasive maneuvers if he is coming right at you.

If he's on your tail, do a loop or barrel roll at low speed. This should put him in front of you temporarily. As soon as he's in front of you, he'll probably turn left or right. The trick here is to see which way he turns, (or guess correctly) then you can pull right on his tail.

Other good maneuvers are the military wingover, the Immelmann turn, and the Split "S". Be sure to practice these and other maneuvers before putting your life on the line.

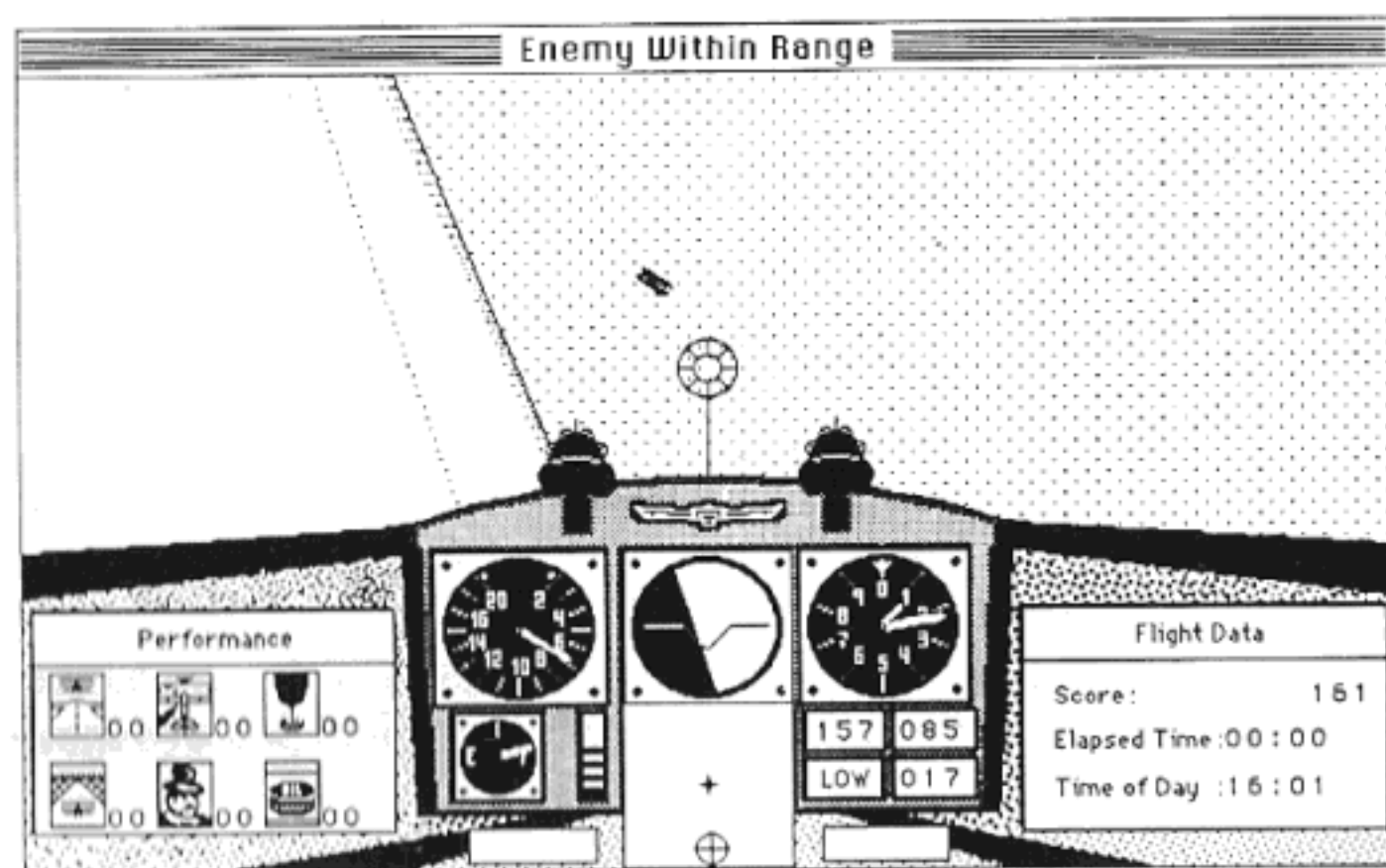
Sometimes it's a matter of doing several radical maneuvers one after the other. This may only get the enemy far enough away to plan how to get on his tail. In any event, while you're maneuvering, the enemy will have a pretty hard time shooting you down.

Main points:

1. Pick up the enemy visually as soon as possible. The saying is, "keep your head on a swivel". When you fly away from your air base, it's imperative to look around periodically. You never know when the enemy will appear on the horizon or dive on you from above. When you see the enemy at a distance, you can plan the first exchange. Anytime you can decide how and when to attack you have a major advantage. Famous WW I flying ace Oswald Boelke said, "Seek an advantage before engaging the enemy".
2. Don't fly straight and level if the enemy is on your tail. Practice the evasive maneuvers outlined in mission 9 and you'll find they become instinctive.
3. The enemy is hard to hit far away. Once you're close you can hardly miss. "Get behind and close to the enemy before firing" – Oswald Boelke.
4. If you see the enemy flying at you, don't fly away. This will present your back side to him, this is not good. Boelke again, "If the enemy dives to attack, turn and face him, don't turn away".

There are several aerobatic maneuvers you can use during a dogfight. Loop and barrel roll have already been mentioned. Other important maneuvers are Lufbery turns, military wingover, and Split "S". Adding these maneuvers to your repertoire makes surviving action a calculated risk rather than a foolhardy adventure.

These maneuvers and others are detailed in mission 9.



The enemy must be at least this close to score hits. He's easier to hit when even closer.

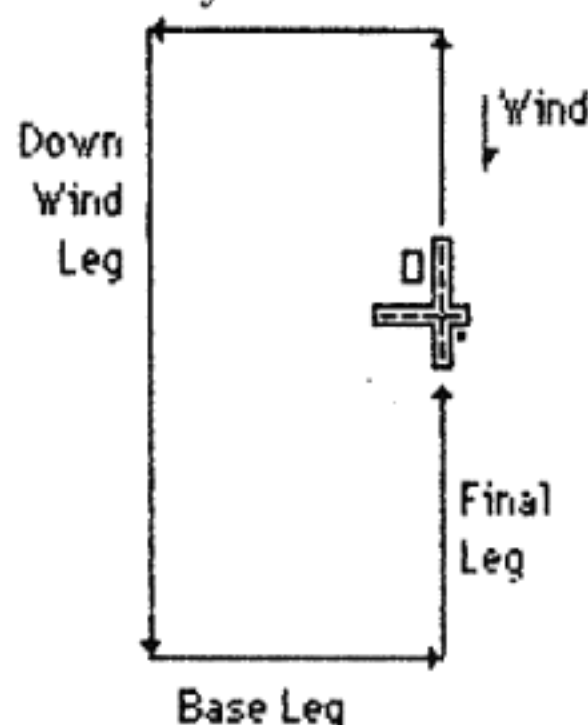
Mission Briefings

Mission 1 - Takeoff and fly.

Follow takeoff instructions from flight school and climb to 6,000 feet. Practice gentle turns left and right. Try to turn to a specific heading. Dive and climb to specific altitudes. Your task is to get control of your aircraft.

Mission 2 - Fly the pattern.

Take off following the Triplane in front of you. The standard pattern is a left hand rectangle:



Pattern altitude is 2,000 feet.

The other aircraft is flying this pattern. When you get good at flying the pattern, form up with the other aircraft and fly in formation, or if you're really a hot shot, fly the pattern inverted.

Mission 3 - Go cross country and refuel.

There is a friendly base directly to the north of Douai. This mission takes you there and back. Select Lille from the ADF menu.

Take off and climb to 6,000 feet. Using the ADF, point the nose in the correct direction and throttle down to "4" to conserve fuel. Now is the time to use Cross Country. Make sure the heading is the same as the ADF says, then take the number of miles and multiply it by 0.6. Then enter the answer as the number of minutes.

Lille is about 20 miles away. The airstrip runs north and south (000 and 180 degrees). Pick a direction and shoot a couple of touch 'n' go's. Then fly back to Douai. You can reset the ADF and use "Go Cross Country" again. Land at Douai, taxi into the hangar, and come to a complete stop. (Be careful not to taxi through the hangar walls.) Turn the engine off by pressing the "" key. After a second or two your fuel gauge will read full and you will get a full load of bombs. You must be stopped in the hangar with the engine off to receive fuel and bombs.

Mission 4 - Dogfight.

The enemy will only engage you away from your air bases. You probably will want to start with armed vs. unarmed. Try this mission armed vs. armed when you feel you're ready. Also, you can select "Enemy flies straight and level" before leaving your base. After you master this option, advance to "Enemy flies level circles", and then "Enemy flies aggressively". Try following the enemy in "Enemy flies loops". It's fun and hard.

Takeoff and make a climbing turn to 270. This will take you toward the trench lines. To make things quicker, you can "Go Cross Country" for 10 minutes. It's important to see your enemy as soon as possible. He may come in high or low, so keep your eyes peeled. If you have anything but "Enemy fly aggressively" selected, the enemy will start in front of you.

The trick is to get the enemy in your gun sights and shoot him down. The mouse button fires your guns. Get as close to the enemy as possible. You can't run out of ammo, so fire as much as you want.

See Military Training for help in a dogfight.

Mission 5 - Balloon busting.

You may want to select "No Enemy Aircraft" if you'd rather not be bothered at first.

Takeoff and climb to 2,000 feet. Take a heading of 270 degrees. Fly until you're over trench lines. Turn up or down the trenches. Seek and destroy any balloons. Watch for enemy aircraft and engage if necessary. Cruising speed is "4", but you might want to slow down on the final approach into the balloons. You must shoot into the center of the balloon. Remember not to fly into the balloon, this is bad. When fuel is below half, return to closest friendly base and refuel.

Mission 6 - Destroy enemy fuel depots.

Takeoff and climb to 6,000 feet. Select primary target from the ADF menu. Fly to and destroy depot. Hazebrouck is a good place to practice, there's one fuel depot and a couple of buildings. You can strafe or bomb the fuel depot. The buildings will blow up if hit by a bomb.

There are three bombing techniques to try. The easiest is to fly very low to the target, straight and level, looking down. When you see the target, drop a lot of bombs (key "B"). The "B" key will drop a bomb, and then the next key press will get another bomb ready. There are 10 bombs aboard.

The second technique is dive bombing. From straight and level, point the nose toward the target. Put the gun sight on the target and when you get low, begin to pull out of the dive. At the same time, drop 3 or more bombs. As you

climb out, you can look back and see how you did.

The third technique is high level bombing. The higher you are the more difficult it gets. Fly straight and level. You'll have to practice to decide just when to drop the bombs. Looking down you can watch the bombs descend the entire distance, and eventually blow up.

As a lark, you can drop all 10 bombs while in a spin or some other maneuver (perhaps inverted) and see what happens.

Mission 7 - Recover spy papers.

We don't know where the spy will be. We do know he'll be beyond the enemy air bases.

It's very important we recover the papers our agent has. Range will determine the success of this mission so do not engage balloons or enemy aircraft.

If you find the spy, come to a complete stop in the square, turn the engine off (""), and the spy will have fuel for you. Good luck.

Mission 8 - Seek 'n' Destroy.

This is a general patrol assignment.

Use all resources available to destroy enemy aircraft, fuel depots, and balloons.

Mission 9 - Practice flying skills and aerobatic maneuvers.

When flying precision maneuvers, pick out a visual reference on the ground. This will allow you to see just how precise your performance is. Also, remember to notice the altitude and heading when you enter a maneuver, and check it against the altitude and heading upon completion of the maneuver.

1. Warm-ups

a. Discipline climbs and turns:

Climb to 5000 feet, 2 miles downwind of airport. Fly as precise as possible.

b. Coordination exercises:

Bring the nose to a heading 000.

Bank left to 45 degrees.

Immediately bank right to 45 degrees.

While banking back and forth, maintain heading and altitude.

Use opposite rudder (right rudder on a left bank) to keep the nose on heading.

c. Lufbery turns:

Bank the aircraft 75-85 degrees.

Pull up hard on elevator.

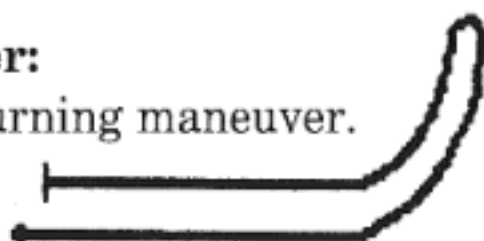
Keep the horizon in the middle of the gun sight.
The following descriptions use the Aresti Key of graphically representing each maneuver.

	Normal Flight		Snap Roll
	Inverted Flight		4 Point Roll
	Slow Roll		Loop
	Barrel Roll		Hammer-head Turn

Aresti Key.

2. Military Wingover:

This is a vertical turning maneuver.



Enter a shallow dive, wings level, lined up on ground reference. Pull the nose straight up through the horizon to about 80 degrees up. Use left or right aileron to turn the aircraft. Use a little forward elevator to keep the nose from coming around. The horizon should come across the nose vertically. Begin pull out as nose drops toward ground.

3. Loop:



Enter a shallow dive, wings level, lined up on ground reference.

Pull the nose straight up through horizon, full throttle.

Continue back pressure on stick until inverted. Once inverted, relax back pressure momentarily to round out top of loop.

Ease off power as aircraft comes around. Be careful not to pull too many G's.

Recover straight and level.

4. Snap Roll:



This is a popular airshow maneuver.

With full throttle, enter a shallow climb, wings level, lined up on ground reference or heading.

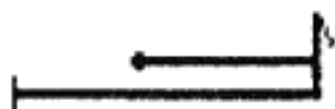
Pull full back on stick, blend in full right aileron and then, full right rudder. This all happens fast, within one second.

From here on in, this maneuver is easy. The aircraft does all the work. Hold full back, right aileron, and right rudder and enjoy the view.

When the horizon comes around, center rudder and level wings.

Setting the stick to "Very Sensitive" makes the snap much quicker.

5. **Hammerhead Turn:**



Another popular airshow maneuver.

Fly straight and level, lined up.

Pull nose straight up, full throttle.

As airspeed drops to just above stall speed, apply full left rudder.

Use right aileron and elevator as necessary to control wing angle.

As nose cuts through horizon, ease off power and use a little forward elevator to keep nose where you want it.

When nose points down, pull up and apply power.

Look left to achieve a straight up attitude.

Look forward when the nose comes to the horizon.

6. **Cuban 8:**



This is two loops side by side with a half roll at the intersections.

Enter shallow dive, wings level, lined up.

Pull up into a loop.

When nose is 20 degrees below horizon, about 3/4's into loop, stop loop with forward pressure on stick.

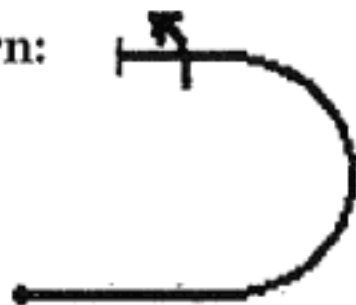
Commence one-half roll with left aileron and left rudder.

Enter second loop. (Make sure you are still lined up.)

Again, perform half roll after about 3/4's loop is complete.

Recover to straight and level flight.

7. **Immelmann Turn:**



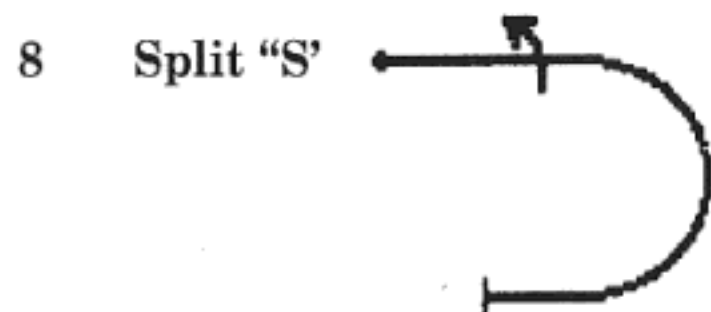
This maneuver, named after famed WWI ace Max Immelmann, is a half loop with a half roll on top.

Enter a shallow dive, wings level, lined up.

Pull up just like a loop.

When nose is 10 degrees above horizon, after a half loop, push forward to stop loop.

Roll upright using left aileron and left rudder.



This is sort of the opposite of the Immelmann turn.

Enter straight and level, lined up.

Roll inverted using left aileron and right rudder.

Pull up completing a half loop.

Caution: check altitude before entering this maneuver. A maneuver entered too low may be completed 6 feet underground.

9. **Barrel Roll:**



Enter a climbing turn to the left.

Immediately use full back and right stick.

Recover straight and level.

10. **Slow Roll:**



Bring the nose 10 degrees above the horizon.

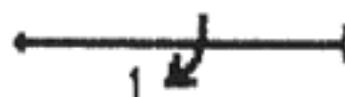
Use half full left aileron, apply a little right rudder.

As the airplane goes inverted, use forward elevator to hold the nose on horizon. Center rudder.

As the wings go vertical, use a little left rudder to hold nose on horizon.

Recover straight and level.

11. **Knife Edge:**



Airshow maneuver.

Fly straight and level, lined up.

Apply left aileron and right rudder.

Bank aircraft 90 degrees.

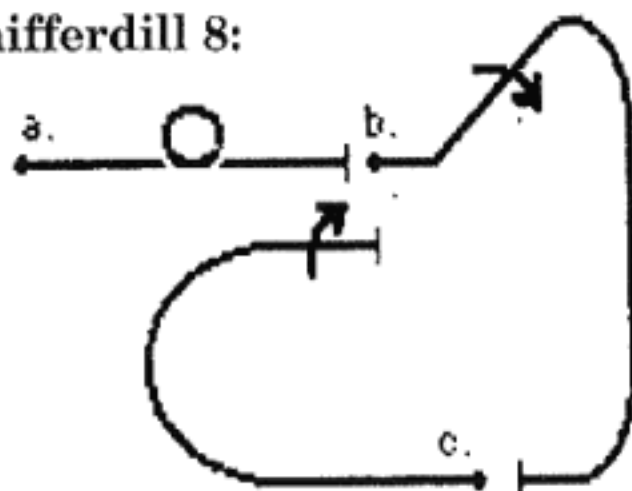
Use two clicks of rudder.

Use considerable forward pressure on the stick to keep aircraft from turning.

Aircraft will be flying with wings vertical.

This maneuver must be mastered before you can do a 4 point hesitation roll.
The following maneuvers are combinations of previous maneuvers.

12. Whifferdill 8:



The Whifferdill 8 consists of:

- a. Simple loop.
- b. Split "S".
- c. Immelmann turn.

13. Avalanche:

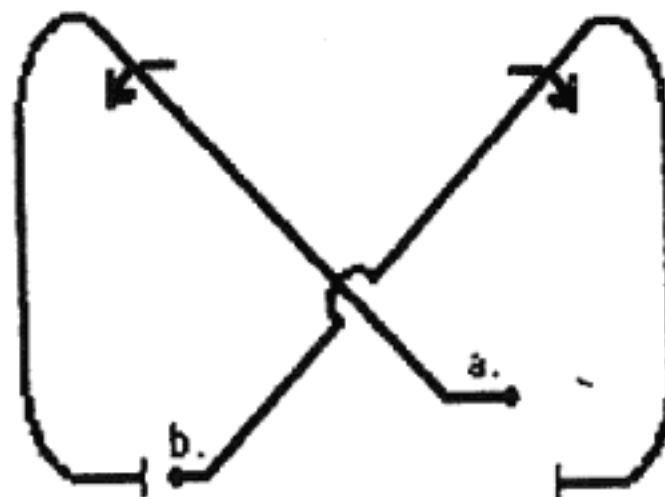


Begin a loop.

At the top, perform a snap roll entered and exited from the inverted.

Finish normal loop.

14. Reverse Cuban 8:

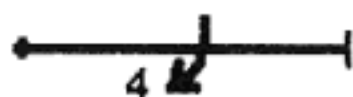


The reverse Cuban 8 is:

- a. Perform a climbing Split "S".
- b. Perform a second climbing Split "S".

This will form an 8 on its side.

15. 4 Point Hesitation Roll:

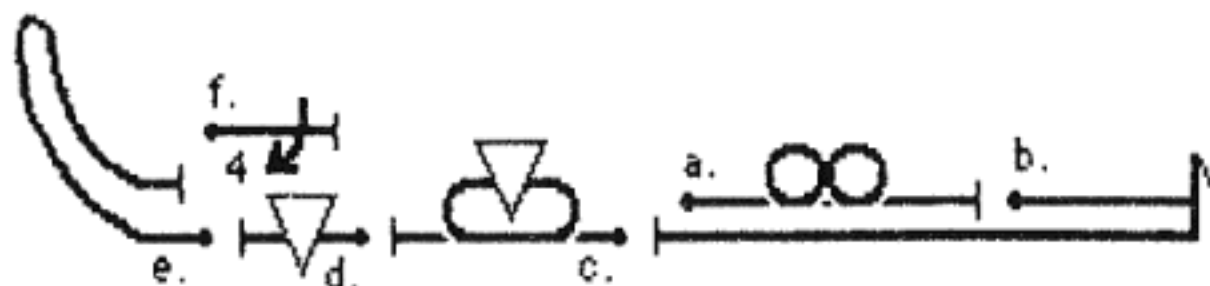


A popular airshow maneuver.

This is the same as a slow roll except that you must pause every 90 degrees around the roll. It consists of:

- Knife edge to left.
- Fly inverted.
- Knife edge to right.
- Recover straight and level.

When you can perform these maneuvers it's fun to combine them in your own order, designing an airshow routine. Here's a typical set of maneuvers:



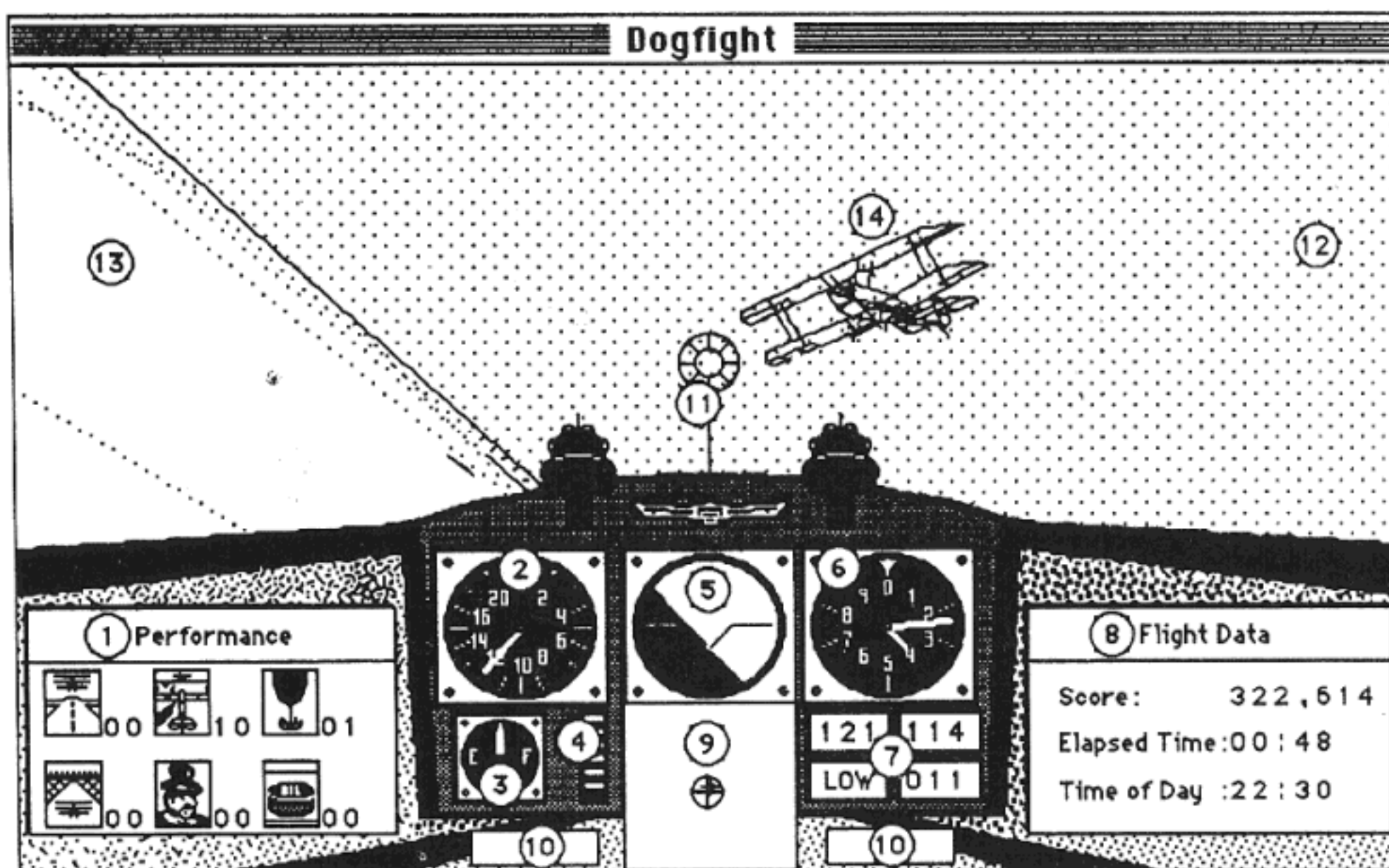
- Cuban 8.
- Hammerhead turn.
- Avalanche.
- Snap roll.
- Military wingover.
- 4 point hesitation roll.

Try to do these maneuvers just 50 feet off the deck, aligned with the long runway. Good luck!

Note: Most roll maneuvers require cross controlling if entered upright. This means that if you roll right, you use a little left rudder to hold heading and to keep the nose from falling. This takes practice. A book such as "Primary Acrobatic Flight Training" can help a bunch when trying to learn aerobatics.

Mission 10 - Fly under bridge

Fly out to the bridge and line up a mile out. Point the gun sight just below the bottom of the bridge. Level off when the bottom of the bridge goes above the gun sight. Be careful not to fly into the ground. As soon as the bridge passes overhead, climb to a safe altitude. For a unique view, look backward as you pass under the bridge. Advanced pilots can try to fly under the bridge inverted.



1. This is the performance box. It keeps track of good things you do. They are, left to right, top to bottom: The number of landings, the number of enemies you've downed, the number of balloons downed, the number of times flown under the bridge, the number of spy papers recovered, and the number of oil depots destroyed.
2. Airspeed indicator. It displays, in miles per hour (mph) your speed through the air. Stall speed is 37 mph.
3. Fuel gauge, keep an eye on it. Refuel by stopping in a hanger and turning the engine off.
4. Throttle position indicator. Totally white when the engine is off, white and black striped means full power.
5. Artificial horizon. This will show you your attitude, even when in the clouds. White is sky, black the ground.
6. Altimeter. This displays the altitude in feet, above sea level. The ground is at 200 feet.
7. These four items are left to right, top to bottom; current compass heading, compass heading to VOR, LOW altitude warning light (flashes when close to the ground), and distance, in miles, to the selected VOR.
8. Flight data shows your current score, the elapsed time, and time of day.
9. Stick box shows the confines of the stick and its relative position. The little cross is the centered position.
10. These two rectangles display the current rudder position. Both white when the rudder is centered, a thick black line will grow on either side to represent rudder movement.
11. Gun sight. When close to the enemy, put the gun sight on him, at a larger distance you'll have to lead him. When the horizon goes through the gun sight, you are flying level.
12. Sky. The sky is shaded with dots.
13. Ground. The ground has a light grid pattern on it. The grid work becomes more visible the higher you fly.
14. Sopwith Camel. The enemy aircraft.

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